



Heat waves and heat days in an arid city in the northwest of Mexico: Current trends and in climate change scenarios

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Abstract:

The aim of this work is to study heat waves (HWs) in Mexicali, Mexico, because numerous deaths have been reported in this city, caused by heatstroke. This research acquires relevancy because several studies have projected that the health impacts of HWs could increase under various climate change scenarios, especially in countries with low adaptive capacity, as is our case. This paper has three objectives: first, to analyze the observed change in the summer (1 June to 15 September) daily maximum temperature during the period from 1951 to 2006; secondly, to characterize the annual and monthly evolution of frequency, duration and intensity of HWs; and finally, to generate scenarios of heat days (HDs) by means of a statistical downscaling model, in combination with a global climate model (HadCM3), for the 2020 s, 2050 s, and 2080 s. The results show summer maximum temperatures featured warming and cooling periods from 1951 until the mid-1980s and, later, a rising tendency, which prevailed until 2006. The duration and intensity of HWs have increased for all summer months, which is an indicator of the severity of the problem; in fact, there are 2.3 times more HWs now than in the decade of the 1970s. The most appropriate distribution for modeling the occurrence of HDs was the Weibull, with the maximum temperature as co-variable. For the 2020 s, 2050 s, and 2080 s, HDs under a medium-high emissions scenario (A2) could increase relative to 1961-1990, by 2.1, 3.6, and 5.1 times, respectively, whereas under a medium-low emissions scenario (B2), HDs could increase by 2.4, 3.4, and 4.0, for the same projections of time.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B2

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Climate Change and Human Health Literature Portal

Geographic Feature:

resource focuses on specific type of geography

Desert, Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Non-U.S. North America

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)